MALACOLOGIA, 2003, 45(1): 169–174

A NEW PANAMIC SPECIES OF THE BIVALVE GENUS *SEMELINA* (SEMELIDAE)

Eugene V. Coan*

Department of Invertebrate Zoology and Geology
California Academy of Sciences, Golden Gate Park,
San Francisco, California 94118-4599, U.S.A.; gene.coan@sierraclub.org

ABSTRACT

A new species of *Semelina*, *S. campbellorum*, is described from the Panamic province, differing from *S. subquadrata* (Carpenter, 1857) in having a longer, more tapered posterior end, orthogyrate rather than opisthogyrate beaks, more lamellar commarginal ribs with fine commarginal threads between the larger lamellae, and a longer, more confluent pallial sinus that reaches the anterior adductor muscle scar. *Semelina subquadrata* is very similar to the western Atlantic *S. nuculoides* (Conrad, 1841). An internal ligament has probably evolved more than once within the Tellinoidea, and the Semelidae is probably polyphyletic. The genus *Semelina* is one of several genera that are of somewhat uncertain position.

Key words: *Semelina*, Semelidae, Panamic province.

INTRODUCTION

In identifying material in connection with preparation of a manual on the Panamic Bivalvia, it was realized that there are two tropical eastern Pacific species of the genus *Semelina*. Study of Carpenter's type material of "?*Montacuta*" *subquadrata* was necessary to be certain which of the two species he described.

As first suggested by Maxwell (1991) in a talk and accompanying abstract, the Semelidae as presently constituted is probably polyphyletic. He cited several pairs of genera with similar external shell morphology, differing chiefly in the presence of only an external ligament (Tellinidae) or also having an internal resilifer (Semelidae). Whereas some examples that he cited may actually represent convergence in general shell morphology, it is likely that an internal ligament has evolved more than once among taxa now allocated to the Semelidae. Indeed, Kamenev & Nadtochy (1999) demonstrated that juvenile *Macoma* have a small internal ligament and are not very different from species allocated to *Abrina* in the Semelidae. Gustav Paulay (personal communication, 19 December 2002) has pointed out that some IndoPacific species, mostly as yet undescribed, now allocated to the tellinid genera *Exotica* and *Semelangulus* actually have both an external and an internal ligament, and some of these are similar to the New World genus *Semelina*, although only the three taxa discussed in this paper have been allocated to *Semelina* in the literature. Additional studies are clearly much needed to sort out the clades within the Tellinoidea.

The following institutional abbreviations are used here: BMNH, British Museum of Natural History collection, The Natural History Museum, London, England; CAS, California Academy of Sciences, San Francisco, California, U.S.A.; LACM, Natural History Museum of Los Angeles County, Los Angeles, California, U.S.A.; USNM, United States National Museum collection, National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.

SYSTEMATIC TREATMENT

Semelina Dall, 1900: 986, 994

Type species (original designation): *Amphidesma nuculoides* Conrad, in Hodge, 1841: 347; Conrad, 1845: 73, pl. 41, fig. 7. Natural Well, Duplin County, North Carolina; Duplin Formation (*sensu stricto*), 3.2 Ma, late Pliocene. Synonyms: *Semele nuculoidea, auctt., nom. null.*; "*Semele*?" *virginiana*

*Mailing address: 891 San Jude Avenue, Palo Alto, California, 94306-2640, U.S.A.; also Research Associate, Santa Barbara Museum of Natural History and the Natural History Museum of Los Angeles County.

Meyer, 1888: 143; *S. nuculoidea lirulata* Dall, 1900: 994; *S. sirulata* Dall, *auctt., nom. null.*

Diagnosis

Small, longer anteriorly; internal ligament in a short to elongate resilifer, not produced ventrally beyond the hinge plate; external ligament in a narrow groove; right valve with elongate anterior and posterior lateral teeth, the left valve fitting into the grooves between them and the dorsal margin; lunule and escutcheon present; right valve with a narrow, inconspicuous anterior cardinal and a large posterior cardinal; left valve with a large anterior cardinal and a narrow posterior cardinal that defines the posterior edge of the resilifer; pallial sinus large, deep. Sculpture of fine, dense commarginal ribs.

This genus first appears in the early Miocene Chipola Formation of Calhoun County, Florida, with *Semelina cythereoidea* Dall, 1900 (p. 994, pl. 44, fig. 5). The eastern U.S./western Atlantic *Semelina nuculoides* is treated by Campbell (1993: 42, pl. 17, fig. 156), Díaz M. & Puyana H. (1994: 97, pl. 28, fig. 268), Gardner (1944: 102–103, pl. 17, figs. 18–21), Lamy (1915), Redfern (2001: 231–232, pl. 99, fig. 948), and Rios (1994: 275, pl. 94, fig. 1352). It now occurs from North Carolina to the West Indies and Brazil, and is recorded as early as the early Pliocene (3.8 Ma) in the southeastern U.S.A.

Semelina subquadrata (Carpenter, 1857)
Figures 1–4

"?*Montacuta*" *subquadrata* Carpenter, 1857a: 248, *nom. nud.*; Carpenter, 1857b: 113; Brann, 1966: 35, pl. 10, fig. 162

"?*Mysella*" *subquadrata* (Carpenter) – Dall, 1899: 881

Rochefortia subquadrata (Carpenter) – Hertlein & Strong, 1947: 135 [in part; their specimen from Bahía Santa Inez, Baja California Sur, is a *Mysella* – CAS 162714; Loc. 17746]

Semelina nuculoides Conrad, *non* Conrad, in Hodge, 1841 – Hoffstetter, 1952: 41

Mysella subquadrata (Carpenter) – Keen, 1958: 107

Semelina subquadrata (Carpenter) – Olsson, 1961: 375, pl. 66, fig. 11; Keen, 1968: 395, fig. 11, 400; Keen, 1971: 259, 260, fig. 661

Description

Ovate-elongate, evenly inflated; beaks almost at posterior end, opisthogyrous; posterior end subtruncate; surface with fine, even, rounded commarginal ribs, some of which become lamellar on posterior slope, while others die out before reaching the posterior slope; pallial sinus ending well short of anterior adductor muscle scar and confluent with the pallial line for only about a third of its length; shell white, sometimes with a pinkish flush. Length to 6.6 mm.

Type Material & Locality

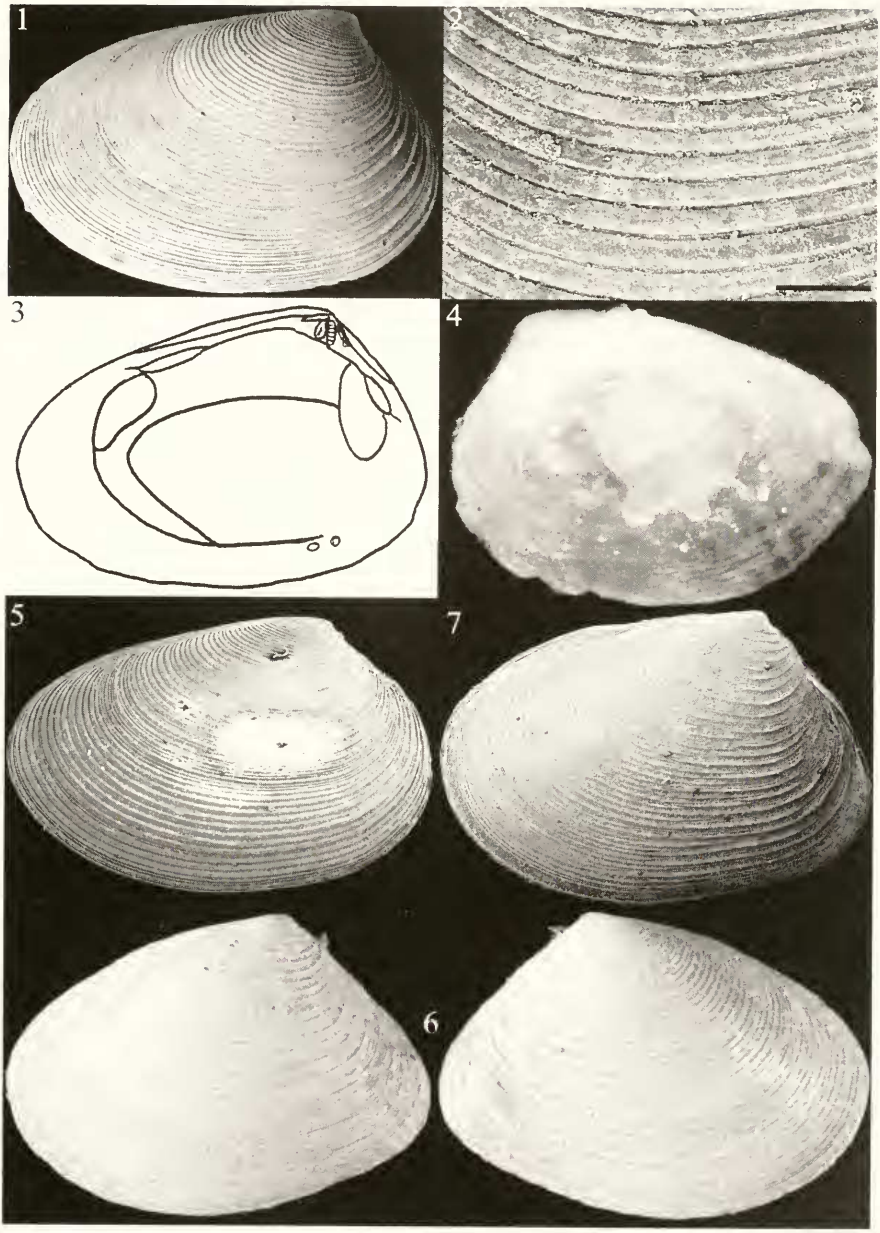
BMNH 1857.6.4.503/1, **lectotype herein**, the larger specimen, a right valve, length = approximately 3.2 mm (Fig. 4); BMNH 1857.6.4.503/2, paralectotype, a smaller left valve measuring approximately 1.2 mm. Both specimens remain glued to Carpenter's original glass slide. Mazatlán, Sinaloa, México (32.2°N); Frederick Reigen. A lectotype is designated because the small glue-covered left valve is too small to be reliable identified.

Distribution

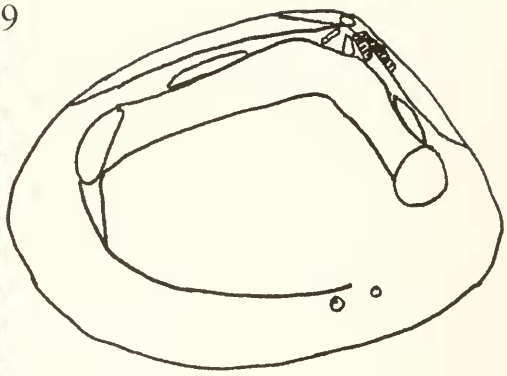
Bahía Magdalena, Pacific coast of Baja California Sur (24.5°N) [LACM 49-234.1], into the Golfo de California as far north as Isla Danzante, Baja California Sur (25.8°N) (Skoglund Collection), and Estero Soldado, Sonora (27.9°N) [LACM 73-5.45], México, to Manglaralto, Guayas, Ecuador (1.9°S) [CAS 162257]; probably as far south as Punta Santa Elena, Guayas, Ecuador (2.2°S), where it has been recorded as a subfossil (Hoffstetter, 1952: 41); Isla Marchena, Islas Galápagos, Ecuador (0.3°N) [LACM 34-285.5]; from the intertidal zone to 220 m (mean = 43.1 m; n = 17); no bottom types noted on labels. I have seen 20 lots; Carol Skoglund provided data for 4 additional lots.

Referred Material

Stations in México: LACM 49-234.1 – Bahía Magdalena, Baja California Sur – 33 m; Skoglund Collection – Isla Danzante, Baja California Sur – 30–45 m; Skoglund Collection – Los Frailes, Baja California Sur – 50–66 m; LACM 73-5.45 – Estero Soldado, Sonora – intertidal zone; Skoglund Collection – Bahía San Carlos, Sonora – 15–30 m; BMNH 1857.6.4.503 – Mazatlán, Jalisco – type lot; CAS 161375 – Mazatlán, Jalisco – "dredged"; Skoglund Collection – Cuastecomate, Jalisco – 12–30 m; LACM 38-263.1, CAS 164336 – Black Rocks,



FIGS. 1–4. *Semelina subquadrata*. FIG. 1. External view of left valve; length, 4.6 mm. SBMNH 348120; Balboa, Panamá; commercial dredgings; *ex* Skoglund Collection. FIG. 2. Same specimen; close-up of sculpture on border between central and posterior slopes; width of ribs approximately 60 µm. FIG. 3. Sketch showing hinge, adductor muscle scars, pallial sinus, pallial line, and cruciform muscle scars of right valve; CAS 161375; Mazatlán, Sinaloa, México; length, 5.1 mm. FIG. 4. Lectotype of "?*Montacuta*" *subquadrata* Carpenter; BMNH 1857.6.4.503/1, right valve approximately 3.2 mm long. FIG. 5. *Semelina nuculoides*. External view of left valve; length, 4.5 mm. SBMNH 348121; 40 miles SE of Charleston, South Carolina; 60 m; *ex* Campbell Collection.
FIGS. 6–7. *Semelina campbellorum*. FIG. 6. Holotype; external views of left and right valves; SBMNH 348119; Bahía de Santiago, Colima, México; length, 4.4 mm. FIG. 7. Paratype; SBMNH 348119; external view of left valve; same station; length, 3.7 mm.



FIGS. 8, 9. *Semelina campbellorum*. FIG. 8. Same specimen as Fig. 7; close-up of sculpture on border between central and posterior slopes; distance between higher ribs approximately 100 µm. FIG. 9. Sketch showing hinge, adductor muscle scars, pallial sinus, pallial line, and cruciform muscle scars of right valve; LACM 37-218.2; Bahía San Ignacio, Sinaloa, México; length, 5.0 mm.

Jalisco – 37 m; LACM 65-16.18 – Bahía Banderas, Jalisco; LACM 33-136.1 – Petatlán, Guerrero – 11 m; LACM 34-241.1 – Petatlán, Guerrero – 183–256 m; LACM 38.9.12 – Bahía Guatulco, Oaxaxa – 73–128 m

Stations in Nicaragua: CAS 164337 – Corinto, Chinandega – no depth recorded; CAS 164338 – Corinto, Chinandega – no depth recorded

Stations in Costa Rica: LACM 72-19.39 – Bahía de Salinas, Guanacaste – 1.5–11 m; LACM 80-60.17 – Cabo Santa Elena, Guanacaste – intertidal zone; LACM 86-26.33 – Playa Nancite, Guanacaste – beach drift; Skoglund Collection – Playa Tamarindo, Guanacaste – 6–15 m; LACM 84-152.5 – Bahía Ballena, Puntarenas – 15–21 m.

Stations in Panamá: LACM 39-259.2 – Isla Ladrones, Chiriquí – 99 m, Skoglund Collection – Balboa, Panamá

Stations in Ecuador: CAS 162257 – Manglaralto, Guayas – no depth recorded; LACM 34-285.5 – Isla Marchena, Islas Galápagos – 37 m

Discussion

As pointed out by Olsson (1961: 375), this species is very similar to the western Atlantic *Semelina nuculoides* (Conrad, in Hodge, 1841), and the two may be indistinguishable. Resolution of this question would require more abundant material of *Semelina nuculoides* from its type locality in the Pliocene of North Carolina than was at my disposal. (Conrad's type material was not located in the Academy of Natural Sciences of Philadelphia by Moore, 1962: 80.) Eastern Pacific material of *S. subquadrata* differs from Recent specimens from North Carolina identified as *S. nuculoides* (Fig. 5) in having higher, more pointed, more posteriorly placed beaks.

Semelina campbellorum Coan, 2002, new species
Figures 6–9

Description

Subtrigonal; anterior end more inflated; beaks about two-thirds of way to posterior end, orthogyrous; posterior end tapered, slightly sinuous, subtruncate ventrally; surface with lamellar commarginal ribs, becoming broader ventrally, and with fine commarginal threads between them; major lamellar ribs more higher near and on posterior slope, whereas some of them become thread-like and end anterior to posterior slope; pallial sinus just touching anterior adductor muscle scar, and confluent with the pallial line for most of its length; internal ligament in a short to elongate resilifer, not produced ventrally beyond the hinge plate; external ligament in a narrow groove; right valve with elongate anterior and posterior lateral teeth, the left valve fitting into the grooves between them and the dorsal margin; lunule and escutcheon present; right valve with a narrow, inconspicuous anterior cardinal and a large posterior cardinal; left valve with a large anterior cardinal and a narrow posterior cardinal that defines the posterior edge of the resilifer. Length to 7.0 mm.

Type Material & Locality

SBMNH 348118, holotype; length, 4.4 mm; height, 3.3 mm; width, 2.0 mm (Fig. 6); SBMNH 348119, paratypes, 7 pairs, including the two figured herein (Figs. 7, 8); USNM 1008293; paratype, 1 pair. Skoglund Coll., paratypes, 5 pairs. Off Punta de Juluapan, Bahía de Santiago, Colima, México (19°5'N, 104°23'W); 30–60 m; Paul & Carol Skoglund; December 1975 and later.

Distribution

In the Golfo de California as far north as Bahia de los Angeles, Baja California (29.1°N) [LACM 86-195.5], and Bahía San Ignacio, Sinaloa (25.4°N) [LACM 37-218.2], México, to Islas Lobos de Afuera, Lambayeque, Perú (6.9°S) [LACM 35-161.1]; Isla Socorro, Islas Revillagigedos, México [LACM 34-246.3, 34-247.5]; Isla Marchena, Islas Galápagos, Ecuador (0.3°N) [LACM 34-285.6]; 5–100 m (mean = 44 m; n = 29). The only bottom type noted on labels is sand. I have seen 28 lots, and Carol Skoglund provided data for an additional lot.

Referred Material

Stations in México: LACM 86-195.5 – Bahía de Los Angeles, Baja California – 5 m; Skoglund Collection – Bahia Concepción, Baja California Sur – 8–15 m; LACM 39-99.10 – Bahía Coyote, Baja California Sur – 4–5 m; LACM 37-185.5 – Isla Ildefonso, Baja California Sur – 91 m; LACM 49-238.1 – Bahía San Francisco, Baja California – 46 m; LACM 78-120.20 – Isla Danzante, Baja California – 43–55 m; LACM 36-144.3 – Isla San Francisco, Baja California – 42 m; LACM 49-237.1 – Bahía Frailes, Baja California Sur – 91 m; LACM 34-247.5 – Isla Socorro, Islas Revillagigedos – 7–18 m; LACM 34-246.3 – Isla Socorro, Islas Revillagigedos – 37 m; LACM 37-218.2 – Isla San Ignacio, Sinaloa – 42 m; SBMNH 348118, 348119, USNM 1008293, Skoglund Collection – Punta de Juluapan, Bahia de Santiago, Colima – 30–60 m – Type lot; LACM 38-265.4 – Bahia Chacahua, Oaxaca – 75 m

Stations in Costa Rica: LACM 72-13.30 – Bahia Juanilla, Guanacaste – 37 m; LACM 72-7.31 – Bahía Santa Elena, Guanacaste – 1.2–11 m; LACM 72-30.26 – Punta Santa Elena, Guanacaste – 12–15 m; LACM 72-57.37 – Punta Quepos, Puntarenas – 21 m; LACM 72-66.38 – Isla del Caño, Puntarenas – 56 m.

Stations in Panamá: LACM 39-259.1 – Isla Ladrones, Chiriquí – 99 m; LACM 38-184.2 – Islas Secas, Chiriqui – 22 m; LACM 34-251.5 – Islas Secas, Chiriquí – 34–146 m; LACM 34-252,9 – Bahía Honda, Veraguas – 55–64 m; LACM 34-114.17 – Isla Jicarita, Veraguas – 44 m

Stations in Colombia: LACM 35-179.5 – Bahía Octavia, Choco – 82 m; LACM 38-224.2 – Isla Gorgona, Nariño – 18–37 m

Stations in Ecuador: LACM 33-180.1 – Bahía Santa Elena, Guayas – 46 m; LACM 34-307.4 – Isla Santa Clara, Guayas – 64 m; LACM 34-285.6 – Isla Marchena, Islas Galápagos – 37 m

Station in Perú: LACM 35-161.1 – Bahia Norte, Islas Lobos de Afuera, Lambayque – 22 m

Discussion

This species differs from *S. subquadrata* (Carpenter, 1857) in having a longer, more tapered posterior end, orthogyrate rather than opisthogyrate beaks, more lamellar commarginal ribs with fine commarginal threads between the larger ribs, and a more elongate pallial sinus. It differs from small specimens of *Semele*, such as *S. jamesi* Coan, 1988 (pp. 33–35, figs. 62, 63), which never attains a large size, in having more prominent lateral teeth, especially the anterior lateral, in the right valve and in having a less conspicuous posterior cardinal in the left valve.

Etymology

This species is named for the Campbell clade of Spartanburg, South Carolina, U.S.A., all of whom have studied and published on the Mollusca – Lyle D. Campbell, Sarah C. Campbell, David C. Campbell, Matthew R. Campbell, and Andrew C. Campbell.

ACKNOWLEDMENTS

Lyle D. Campbell kindly provided Pliocene and Recent specimens of *Semelina nuculoides* for examination. Kathie Way of The Natural History Museum, London, loaned Carpenter's type material of *Semelina subquadrata*; Lindsey Groves of the Natural History Museum of Los Angeles County, California, and Elizabeth Kools of the California Academy of Sciences, San Francisco, California, loaned material from those collections. Carol Skoglund made material and data from her collection available to me, including the specimens that became the type lot of *S. campbellorum*. Gustav Paulay provided information about systematic relations in the Tellinoidea. Yolanda Camacho took the SEM photographs, and Daniel L. Geiger prepared the plates.

LITERATURE CITED

BRANN, D. C., 1966, *Illustrations to "Catalogue of the collection of Mazatlan shells" by Philip P. Carpenter*. Ithaca, New York (Paleontological Research Institution). 111 pp., 60 pls.

CAMPBELL, L. C., 1993, Pliocene molluscs from the Yorktown and Chowan River formations in Virginia. *Virginia Division of Mineral Resources Publication*, 27: vii + 259 pp., incl. 43 pls.

CARPENTER, P. P., 1857a, Report on the present state of our knowledge with regard to the Mollusca of the west coast of North America. *Report of the British Association for the Advancement of Science*, 26[for 1856]: 159–368 + 4, pls. 6–9.

CARPENTER, P. P., 1857b, *Catalogue of the collection of Mazatlan shells, in the British Museum: collected by Frederick Reigen*. London (British Museum). xii + 552 pp. [some as i–iv + ix–xvi] [also published simultaneously as *Catalogue of the Reigen collection of Mazatlan Mollusca, in the British Museum*. Warrington (Oberlin Press). viii + xii + 552 pp.] [reprinted by Paleontological Research Institution, 1967].

COAN, E. V., 1988, Recent eastern Pacific species of the bivalve genus *Semele*. *The Veliger* 31(1/2): 1–42.

CONRAD, T. A., 1841. See Hodge & Conrad (1841).

CONRAD, T. A., 1845, *Fossils of the (medial Tertiary or) Miocene formation of the United States*, no. 3. Philadelphia (Dobson). Pp. 57–80, pls. 30–32.

DALL, W. H., 1899, Synopsis of the Recent and Tertiary Leptonacea of North America and the West Indies. *Proceedings of the United States National Museum*, 21(1177): 873–897, pls. 87, 88.

DALL, W. H., 1900, Contributions to the Tertiary fauna of Florida, with especial reference to the silex beds of Tampa and the Pliocene beds of the Caloosahatchie River, including in many cases a complete revision of the generic groups treated of and their American Tertiary species. Part V. Teleodesmacea: *Solen* to *Diplodonta*. *Transactions of the Wagner Free Institute of Science of Philadelphia*, 3(5): 949–1218, pls. 36–47.

DIAZ M., J. M. & M. PUYANA H., 1994, *Moluscos del Caribe Colombiano. Un catálogo ilustrado*. Santafe de Bogota (Colciencias & Fundación Natura Colombia). 291 pp., [12] + 78 pls.

GARDNER, J., 1944, Mollusca from the Miocene and lower Pliocene of Virginia and South Carolina. Part I. Pelecypoda. *United States Geological Survey Professional Paper*, 199A: iv + 178 pp., 23 pls.

HERTLEIN, L. G. & A. M. STRONG, 1947, Eastern Pacific expeditions of the New York Zoological Society. XXXVI. Mollusks from the west coast of Mexico and Central America. Part V. New York Zoological Society. *Zoologica*, 31(4): 129–150, pl. 1.

HODGE, J. T., with an appendix by T. A. CONRAD, 1841, Observations on the Secondary and Tertiary formations of the southern Atlantic states. *American Journal of Science and the Arts*, 41(2): 332–348, pl. 2 [Conrad appendix: pp. 344–348, pl. 2].

HOFFSTETTER, R., 1952, Moluscos subfósiles de los estanques de sal de Salinas (Pen. De Santa Elena, Ecuador). Comparación con la fauna actual del Ecuador. *Boletín del Instituto de Ciencias Naturales*, 1(1): 3–79.

KAMENEV, G. M. & V. A. NADTOCHY, 1999, Species of *Macoma* (Bivalvia: Tellinidae) from the Pacific coast of Russia, previously described as *Abrina* (Bivalvia: Semelidae). *Malacologia* 41(1): 209–230.

KEEN, A. M., 1958, *Sea shells of tropical west America; marine mollusks from Lower California to Colombia*, 1st ed. Stanford, California (Stanford University Press). xii + 624 pp., 10 pls. [repr.: 1960].

KEEN, A. M., 1968, West American mollusk types at the British Museum (Natural History), IV. Carpenter's Mazatlan collection. *The Veliger*, 10(4): 389–439, pls. 55–59.

KEEN, A. M., 1971, *Sea shells of tropical west America; marine mollusks from Baja California to Peru*, 2nd ed. Stanford, California (Stanford University). xiv + 1064 pp., 22 pls. [repr., 1984 with only 12 pls.].

LAMY, E., 1915, Note sur le *Semele nuculoides* Conrad. *Bulletin du Muséum d'Histoire Naturelle* 21(1): 17–18.

MAXWELL, P.A., 1991, Clades vs. grades in bivalve classification – some examples from the Tellinacea. *American Malacological Union, Program and Abstracts, 1991*: 42.

MEYER, O., 1888, On Miocene invertebrates from Virginia. *Transactions of the American Philosophical Society* 25(127): 135–144, 1 pl.

MOORE, E. J., 1962, Conrad's Cenozoic fossil marine mollusk type specimens at the Academy of Natural Sciences of Philadelphia. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 114(2): 23–120, 2 pls.

OLSSON, A. A., 1961, *Mollusks of the tropical eastern Pacific particularly from the southern half of the Panamic-Pacific faunal province (Panama to Peru)*. Panamic-Pacific Pelecypoda. Ithaca, New York (Paleontological Research Institution). 574 pp., 86 pls.

REDFERN, C., 2001, *Bahamian seashells: a thousand species from Abaco, Bahamas*. Boca Raton, Florida (Bahamianseashells.com). x + 280 pp., 124 pls.

RIOS, E. de C., with the collaboration of, M. HAIMOVICI, J. A. ALVARES PERES & R. AGUIAR DOS SANTOS, 1994, *Seashells of Brazil*, 2nd ed. Rio Grande (Universidade do Rio Grande). 368 pp., 113 pls.

Revised ms. accepted 13 January 2002